

# THE INTERFACE



# IEEE



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<http://www.ehw.ieee.org/soc/es/>

## *From the IEEE Vice-President, Educational Activities*

### **Can We Bring Licensing Back from the Brink of Extinction?**

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Every year the IEEE Philadelphia Section organizes a public debate between the candidates for IEEE President-elect. I have been attending these meetings for some 20 years now, and saw some fifty candidates.

The audience often asks the same questions – what in your opinion is the greatest challenge that IEEE faces; what can IEEE do for under-employed and unemployed members; how can we increase the fraction of IEEE student members who become full members upon graduation. The candidates do their best to be thoughtful and entertaining. In the process a healthy dose of slogans of the day is often offered. A few years ago one of the candidates challenged another using the then-trendy question borrowed from fast food commercials – “where is the beef?”. This year the candidates said often that “the world is flat,” referring to the title of a not-too-thoughtful best seller which happens to be in the vogue.

In this last debate, one of the audience members insisted on finding out whether the three candidates for IEEE President-elect, all US citizens who practice engineering there, were also registered professional engineers (P.E.) in their respective states. If not – he wanted to know why not. When the question was asked everybody was smiling a little, though some of the smiles appeared forced. To some it felt as if this question belonged to older times, when this matter was of some importance – like asking whether the candidates understood vacuum tubes, or knew how to use a slide rule.

To no one’s surprise no candidate was a P.E., and yet the candidates appear to have done very well in life without this title. All are well-known respected professionals, and two are even members of the National Academy of Engineering.

Their answers to the P.E. question were simple: they saw no particular reason why they should bother with it. They could not cite any instances that required it, or any opportunities that were missed as a result of not having it. They were advised by mentors and colleagues not to waste time and effort on registration, and they were living proof that this advice was good.

This state of affairs is typical. Registration among electrical engineers in the US is low; less than 15% have bothered to register. Among the various groups within electrical engineering, power engineers, independent consultants, and engineers in government employ appear to be more inclined to register. The rest – including many in communications, signal processing, control, or computing – do not seem to worry about it. Registration among computer engineers and biomedical engineers is by all evidence at even lower levels, perhaps less than 5%. There are very few, if any, licensed engineers on the boards of IEEE-USA or ASEE, let alone the National Academy of Engineering. The bodies that participate in the administration of the licensure system, the various professional associations of engineers, NCEES, NSPE and others keep proposing various reforms and rearrangements of the system. None of these seems to have taken hold. Codes of ethics and public announcements of engineering associations in favor of licensure are belied by the fact that the leaderships of these associations go largely unlicensed. Enforcement of licensure laws is often anemic, and very low on the priority list of State law enforcement agencies. Left on its present course, registration of electrical and computer engineers in the United States is likely to become less and less relevant, if not fade away altogether.

# August 2005

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Most commentators and task forces that addressed this issue in the last few years tended to be long on reform proposals and short on solid explanations for the present sorry state of electrical engineering registration. Paradoxically, most reform proposals suggest making this already unpopular process even more complicated and demanding. They add more hurdles and intermediary titles, and exclude many individuals who are eligible to participate in the process at present. Lamenting the decline of public education in general, and of higher education in engineering in particular, some commentators even propose to make the Master of Science the first professional degree for engineers. Licenses will then be provided only to MS holders (not before they are faced with a barrage of special exams and experience requirements). I found much of this literature surreal. It is detached from the dynamics of the marketplace, and it does not explain how the rather useless P.E. title would somehow be reborn if the proposed reforms were adopted.

Missing from the numerous discussions is a clear rationale as to why the public should demand that electrical engineers be licensed. In spite of the fact that virtually no engineers working in communications, control or computing are licensed, the public does not feel that its health and welfare are threatened. Interestingly, the public does not feel the same way about physicians, pharmacists, or even barbers. A few days ago there was even a very public call to license manicurists! Either there are already enough mechanisms in place to protect the public from low quality plans and hazardous devices proposed by unqualified electrical engineers, or perhaps the current registration and licensure processes are not perceived to provide any advantages in this area. If electrical engineering is already safe enough

and requires no additional regulation, then perhaps we need not fret any longer about registration, licensure, and FE and PE exams. If the current registration process is not a meaningful differentiator between licensed and unlicensed practitioners in terms of safety, health, and welfare of the public, then we need to modify the licensure requirements to emphasize these aspects.

Modifying the licensure process to emphasize protection of the public will also address the “core curriculum” debate. At present the licensure exams are based on the belief that there exists (or that there must exist) a recognized foundation of scientific and technical knowledge that all electrical engineers must possess. However, accreditation of engineering programs tends to assess programs primarily against their own stated goals, rather than against a sanctified basic curriculum. In this atmosphere, attempts to invent or maintain a common core are illusory. Instead, it might be more desirable to leave the technical competence of graduates to the accreditation agencies (such as ABET), and to focus the licensure process on the safety and welfare of the public, on understanding and using industrial standards, and on ethics.

Needless to say, the current licensure exams will have to undergo a radical change. At the present they concentrate on specialized technical knowledge, and in almost all respects are not any different from exams in a typical (rather conservative and somewhat outdated) undergraduate curriculum. Doing away with these exams would also allow the professional associations to invite unlicensed engineers who have degrees from accredited programs to re-join the registration process. Otherwise the sheer number of these unlicensed practitioners would make any reform impractical.

Finally, if a serious reform of engineering licensure were to be successful, it would have to extend or reconcile licensure in the United States with licensure in other countries. The increased globalization of the engineering profession – including the division of labor between engineering groups around the globe – means that no national (let alone State or Province) licensure plan can be effective in isolation. Addressing this issue is a tall order; to start, it requires meaningful mutual recognition of accreditation (which we do not have at present). However, without a transnational component no reform can be successful in the current transnational market.

I hope we will start a meaningful discussion along these lines in meetings of ABET, NCEES, NSPE, ASEE and IEEE. Sadly, the discussions we have had in the last decade were not particularly useful. Most of these followed a 1950-like business environment, and proposed models that excluded the majority of current practitioners from the process. Or, they sought to make a highly

unpopular process even less popular and certainly more cumbersome.

Let me conclude by providing the requisite personal disclosures. Yes, I am a registered Professional Engineer – in the State of Pennsylvania. I took the exams in 2001-2002, many years after graduating from an undergraduate EE program. The experience was a bit strange. I had to review basic material in some relevant areas, but also a large volume in areas that hardly have an association with the practice of any modern electrical engineer. I received my license in October 2002 and have a certificate to that effect somewhere in my office. Since then, I have appeared several times as an expert witness in State and Federal court hearings and have testified in front of several zoning boards. No one has ever asked if I am licensed, and I am yet to find any good use for my new credentials...

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## IEEE Conferences and other Activities of the ASEE Electrical/Computer Engineering Division

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2005 continues to be an active year for the ASEE's Electrical/Computer Engineering Division. **Satish** worked very hard with assistance from reviewers, session chairs and other officers of the Division to put together an excellent program for the Annual ASEE Conference in Portland, Oregon USA..

With a busy schedule for everyone, it is easy to forget how important it is to still find time to contribute to ASEE (e.g., ECE Division), IEEE (e.g., Education Society) and other professional societies. We also want to make sure active contributions to the societies are recognized, so it is a pleasure to find out that this year's Division awards (meritorious service and distinguished educator) will be given to **Pat Daniels** and **Joe Hughes**, respectively. Congratulations to both Pat and Joe!

With the many activities that our members are involved in, it will be difficult to mention them all. In addition to our active programs during the ASEE Annual Conferences and other regional/national conferences, we continue to have good success with a series of IEEE Conferences which we started in 2000: Electro/Information Technology (or eit) Conferences. During May 22-25, 2005 this conference was hosted by the University of Nebraska-Lincoln. Keynote speakers included **Brian Halla** (CEO and President of National

Semiconductors) and **Kirstie Bellman** (Principal Director, Aerospace Corporation), both have interesting messages that related to global marketplace, educational issues when dealing with complex systems and mathematical modeling/simulation and other information technological problems that we may face in the coming years. In addition to keynote presentations,

the conference offered an excellent technical program with paper presentations from IEEE members in Region 4 (primary sponsor of eit conferences), and other regions, including many international authors. We have also included professional development workshops in these eit conferences; examples include: tutorials on subjects like LabVIEW, Digital Signal Processing, Leadership, Project Management, Intellectual Properties. We are happy to announce here that the 2006 IEEE eit conference will be hosted by the College of Engineering and the ECE Department, Michigan State University, E. Lansing, Michigan, May 7-10, 2006. Conference chairs are: H.

Mousavinezhad (eit conferences general chair), S. Udpa and L. Udpa (e-mail: [udpal@egr.msu.edu](mailto:udpal@egr.msu.edu) for additional information regarding the 2006 conference.) [Please note that Dr. S. Udpa was just appointed as dean of engineering at Michigan State University, congratulations Satish!]



**Hossein** also attended the IEEE membership development retreat (as MD chair of the education society), April 29-May 1, 2005 in Piscataway, New Jersey. It is interesting (and exciting) to know that there is world-wide interest in IEEE membership and its value-adding and networking attributes. All 10 Regions were represented at the retreat and good ideas with best practices were shared among attendees. **Mike Binder**, IEEE membership director, and **Roger Sudbury**, vice chair of the membership development committee, moderated the event. A group picture taken at the conclusion of the retreat appears on the right.



## *From the Electrical and Computer Engineering Department Heads Association (ECEDHA)*

### **BIO-X in ECE and Other Current Topics in Engineering Education Featuring an Overview of the 2005 Annual ECEDHA Meeting**

*Ken Jenkins, ECEDHA President  
Pennsylvania State University*

*Stephen Goodnick, ECEDHA Past President  
Arizona State University*

*Ken Connor, ECEDHA Vice President  
Rensselaer Polytechnic Institute*



Ken Jenkins



Stephen Goodnick



Ken Connor

The Twenty-First Annual ECEDHA meeting was held in New Orleans on March 18-22, 2005, featuring the theme of “*The Future of Bio-Science and Bio-Technology in Electrical and Computer Engineering*”. In the April 2005 issue of *The Interface* we described how the many sessions and associated discussions at the annual meeting wrestled with questions of how much biology should be included in a required ECE curriculum, and which traditional subjects can be minimized in order to accommodate more biology in the curriculum. The rest of that article was devoted to a philosophical discussion about the interplay between biology and the ECE curriculum. Our goal in this column is to highlight key meeting activities and summarize some of the sessions that took place at the 2005 Annual Meeting.

The Twenty-First Annual ECEDHA meeting opened with an invited plenary panel session on “*The Importance of Biology in ECE Education and the ECE Profession of the Future*.” Panelists in this session were Dr. **Mita Desai** from NASA (formerly from NSF), Dr. **Radislav Potyrailo** from the GE Global Research Center, Prof. **Vasundra Varadan** from the ECE Department at the University of Arkansas, and Prof. **Vijay Varadan** from the ECE Department and the School of Medicine at the University of Arkansas. Dr. Desai’s talk centered around her experiences with bio-computing and neuro-systems initiatives while serving as a program director

at NSF. Dr. Potyrailo focused his talk on his industrial experiences with sensor technology in general, and with bio-sensors in particular. Prof. Vasundra Varadan drew on her recent experiences as the Director of the Electrical Engineering Directorate at NSF to develop a general theme of “*Humanizing the EE curriculum and re-engineering the human body*”. Prof. Vijay Varadan’s presentation illustrated today’s close interactions between the ECE profession and the practice of medicine, which he effectively highlighted with videos of patient responses to therapies administered via electrical stimulation of the brain and central nervous system. All of these talks served to emphasize the increasingly important interactions between biology and electrical and computer engineering. They also raised provocative questions concerning the need to modernize the ECE curriculum in order to better prepare graduates for a world in which biology plays an increasingly important role in the ECE profession.

The Keynote Address for 2005 ECEDHA meeting was delivered by **Kristina Johnson**, Dean of Engineering at Duke University, on “*The Importance of Biology in an Integrated, Application-Focused ECE Curriculum*”. Dean Johnson’s presentation addressed major issues, including: i) general thoughts on the ECE curriculum – factors influencing change, ii) what can the biological sciences do for engineering and ECE in particular,

iii) what can Engineering and ECE do for Biology, and iv) how can we best integrate the individual pieces of our curriculum into an educational system. Her talk integrated ideas extracted from concepts such as the “mission of the University,” the “great cultural disciplines,” the “need for continuous change,” and “what engineering graduates need to know” to function and contribute most effectively in the modern world. Dean Johnson’s Keynote Address included an analysis of gender demographics, and highlighted the need to proactively recruit more women students into the various the fields of engineering.

**Gary Gabriele** (NSF EEC director) addressed *Future Funding Directions in Engineering Education at NSF*. The NSF Engineering Education and Centers Strategic Plan for Education includes moving the focus to research to understand better how students gain understanding, expertise, do better design, etc. Engineering Education and Human Resources strategies focus on such research and attracting more talented and diverse students to engineering. They plan to help build a community of scholars on engineering learning (increase funding) and add a focus on graduate and faculty mentoring programs. Where can we start? Explore Service Learning, new graduate programs for non-engineering BS students, partnerships for curriculum research outside engineering and mentoring programs for women and minorities (See [www.bestworkforce.org](http://www.bestworkforce.org) for ideas).

In the panel session on *Educational Research*, organized by **Ken Connor**, **Jeff Froyd** (Texas A&M), **P. K. Imbrie** (Purdue), **Don Millard** (RPI) and **Bill Robbins** (Minnesota) described past, present and future activities in engineering education research. The Foundation Coalition (Texas A&M and elsewhere) has a wide variety of resources and research that most of our departments should find useful. Of particular interest are assessment materials for ABET and concept inventories for most of the basic ECE courses. Purdue has established a new Department of Engineering Education that builds on its national leadership in activities such as EPICS to address the entire spectrum of engineering education. Rensselaer is developing a compact, low-cost board that replaces all standard lab instruments which will enable students to carry their studio experiences to any venue and greatly expanding hands-on learning activities at any university. Minnesota has undertaken a complete reform of the undergraduate electric power curriculum to address declining enrollments while employment opportunities have been expanding. The overarching approach has been to address twice the number of topics with twice the depth by emphasizing modern design tools, hands-on laboratory experiences, and training workshops for faculty.

Another panel session organized by **Magdy Bayoumi**, Director of the Center for Advanced Computing Studies and Head of the Computer Science Department at the University of Louisiana at Lafayette, attempted to answer the question of “*Why Evaluate Faculty?*” Prof. **Kent Fuchs**, Dean of Engineering at Cornell and Prof. **Ken Jenkins**, Head of Electrical Engineering at Pennsylvania State University discussed motives and procedures from both a Dean’s and a Department Head’s perspective. The dominant message that emerged from this session is that annual evaluations serve the dual role

of evaluating and rewarding annual performance, and also mentoring and guiding the faculty members in their career development, regardless of the stage where the faculty are in their careers. Since mentoring and counseling faculty members differs significantly from stages of early career to late career, annual evaluations must be done with a considerable deal of “personal touch” and cannot be effectively delegated to any sort of automated procedures.

One of the most timely and difficult issues facing ECE departments is determining how the Biotech revolution should impact our curricula. In a session organized by **Yih-Fang Huang** (Notre Dame), we heard from **Nihat Bilgutay** (Drexel), **April Brown** (Duke), **Mark Smith** (Purdue), **Ken Connor** (RPI) and **Bruce Wooley** (Stanford) on the topic: *How Much Biology in the ECE Curriculum?* Essentially all major research universities are investing very heavily in research in the life sciences with the result that Biotech is now the major growth area for funding. The exciting results of this research have been working their way into existing ECE courses and new courses specifically developed in areas such as bio-imaging and bio-circuits. New tracks or concentrations are being developed, usually in combination with new or existing Bio-medical or Bioengineering departments. This has had the added benefit of making ECE programs more attractive to women and minority students. Even with so much Biotech activity, very few schools have instituted a biology requirement for all students, rather they have focused on having sufficient flexibility so students can take elective courses in the life sciences. Those that have a requirement, generally specify a fairly standard intro-level course but would greatly prefer a Bio/ECE course developed for our students.

The last session of the 2005 meeting was a panel session entitled “*Engineering Workforce, Globalization and Workforce Dynamics*”, inspired by the plenary talk given by NAE President **William Wulf** on the same topic at the 2004 ECEDHA meeting. The panelists for this year’s session were **David Ferrell**, Director of Workforce Strategy for the Semiconductor Industry Association, and **Ronil Hira**, Vice President for Career Activities of IEEE-USA and Professor of Public Policy at the Rochester Institute of Technology, who provided diverse viewpoints on the nature and causes of engineering outsourcing, and related effects in terms of science and engineering education. From the industry perspective, root causes for off shoring stem from systemic problems in science and engineering education in the US, which lags behind other first-world nations in metrics related to math and science skills, to numbers of engineers enrolling and graduating from universities versus countries like India and China. New markets and opportunities abroad also accelerate the growth of jobs overseas. Another perspective was that off-shoring of jobs is more economical for U.S. corporations due to large existing differentials in salaries between the U.S. and developing countries, and that this trend will increase while cost benefit is derived, leading to downward pressure on wages and increased unemployment in the domestic high tech labor market. While the entire mosaic of globalization is

poorly understood at present, it was clear from the reaction of the participants and the ensuing discussion that globalization of engineering is a critical fact of present day that has to be addressed in educational programs in the US and abroad. This issue is of such growing importance that ECEDHA has undertaken to organize a two-day workshop entitled “*The Impact of Globalization on Electrical and Computer Engineering Education*” to address the curriculum needs in electrical and computer engineering in the face of a world economy and the enormous growth of engineering education outside of the US.

For readers who have interest in further details of the 2005 annual meeting program, copies of presentations are available at <<http://www.ecedha.org>><<http://www.ecedha.org>>.

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## *From the President of the IEEE Education Society*

### Who We Are, Where We're Going, How we get there...

Dan Litynski  
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Our vision is to be a global leader in educational innovation, pedagogy, and research. The key to realizing that vision is the knowledge, dedication, and participation of our members who are among the recognized leaders in education around the world. We want to hear from you about the future of our society and how we fulfill and grow that vision.

The past fifteen years have seen an unprecedented reformation of the global political, economic, and technological structure. The proliferation of information due to increased production, broadband transmission, and increased storage of raw and processed data challenges the traditional teaching and learning academic systems. At the June 2005 *ASEE Annual Conference* in Portland, Oregon, USA, and the IEEE Organizational Series Meeting in Chantilly, Virginia, USA, many speakers reflected on the changing technological and educational landscape that is challenging us all, and how that will affect the shaping of engineers over the next 10 to 20 years.

The IEEE *Education Society* provides its members a means for professional collaboration, communication, and dissemination of intellectual property. Our widely recognized publications and conferences connect educational leaders across the globe. Our awards recognize the exceptional contributions to educational innovation and service of the best among us. Our members serve in myriad organizations that promote innovative practice and research in education worldwide.

But as we look to the future, what is the role of the Society in the next five to ten years? How can we advance education in the engineering and science of the disciplines contained in the field of interest we profess? What new disciplines should we embrace? How can we best serve our current members: junior faculty, senior faculty, administrators, students, industrial educators, engineering and scientific practicing profes-

sionals, and technical managers among others? What should we do to serve others in the profession who are not currently members and attract them to become members? How do we support the rapidly growing number of society chapters as we grow in a time when many professional societies are declining for many reasons?

The Education Society's Administrative Committee (AdCom) held its semi-annual society meeting during the recent ASEE annual meeting and reviewed many issues including a discussion of the Strategic Planning Process (SPP) for the next few months. The goal is to have a preliminary plan for review at the next semi-annual meeting at the *Frontiers in Education* (FIE) Conference in October in Indianapolis, IN, USA. To guide the process, the AdCom established an SPP Steering Committee (SPPSC), initially composed of the four society officers and the immediate two past presidents. It may grow as Working Groups address specific issues in the future. The SPP will build upon the five-year society review by the IEEE completed over the past few months, our constitution, and the previous society strategic plan.

We hope to include input from all of our constituencies during the process and look forward to working with all of you. Our website <http://www.ewh.ieee.org/soc/es/> contains much information about who we are, and we hope to use it as a means of receiving feedback from members as we progress. For the immediate future, please feel free to email me with your thoughts on the questions we have posed above. Your input may help guide the SPPSC as we examine the issues over the next few weeks.

Best wishes,

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## *From the Chair of the IEEE Committee on Engineering Accreditation Activities*



### Engineering Accreditation Update

*John Orr, Chair  
IEEE Committee on Engineering Accreditation Activities*

#### Criteria Wording Changes

The Engineering Criteria for visits in 2005-06 contain a number of significant changes in wording as well as changes in location of some of the items. In particular, the wording in Criterion 2 has been revised in several places. It is now clear that ABET does not expect proof that every graduate accomplishes every Program Objective and it is emphasized that the Program Outcomes (Criterion 3) should prepare graduates to achieve the Program Objectives. There is no change in the intent of Criterion 2, but the new wording makes that intent more evident. Regarding Criterion 3, you will find that much of the wording regarding the major design experience (previously in Criterion 4) has been moved to item (c) in Criterion 3, with some revisions. Note in particular that now the list of design constraints is preceded by the modifier "such as" rather than "most of" and that the design abilities demonstrated in Criterion 3 need not be in the context of a "major design experience." It is now also made clear that if the program lists outcomes in addition to 3 a-k, the program must demonstrate that students achieve these additional outcomes. Criterion 4 continues to contain reference to the "major design experience," with a simplified wording: "Students must be prepared for engineering practice through the curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints."

#### ABET's Participation Project

In January, 2005 ABET initiated a major project to review and improve every aspect of the recruitment, training, and assessment of all of the volunteers who implement the accreditation process. Dubbed the "Participation Project," the initial phase included comprehensive data gathering from 1400 web surveys as well as 40 face-face and telephone interviews with program evaluators, team chairs, and others involved in accreditation, all conducted by a consulting organization, Cardea Communications. This process resulted in a report detailing strengths and weaknesses in the current accreditation system that can be related to the volunteer selection/training/assessment process. It will be no surprise that "consistency" in implementation of the accreditation process was one area mentioned frequently as needing improvement. Also, many of the current Program Evaluators stated that they felt less than completely confident of their abilities after the current one-day evaluator training workshop. Finally, accreditation team chairs noted the frequent need to come to the assistance of evaluators, adding to the team chair workload.

Phase II of the project is now underway, and will result in new processes for recruitment, selection, training, and assessment of

evaluators and other volunteers for all of the ABET Commissions. These will be implemented and tested in Phase III, revised as necessary in Phase IV, and implemented with an ongoing continuous improvement component in Phase V. The target for completion of Phase II is August, 2005, with completion of the overall project by the end of 2006.

Project deliverables include:

- Criteria for volunteer selection at all levels.
- Process for volunteer recruitment.
- Comprehensive training and certification program, including trainer training and evaluator retraining, team chair training, Executive Committee member training, Board member/committee member training.
- Process for volunteer performance evaluation, including mechanisms for recognition, remediation, and removal at all levels.
- Organizational plan that delineates the roles and responsibilities of the societies, volunteers, commissions, Board, and ABET staff in these processes.
- Strategies for continuous improvement of the participation program.

The Participation Project is being implemented by representatives from the member ABET societies, both volunteers and society staff members, along with ABET staff members and Cardea Communications. Several representatives from IEEE are participating in this project including **Pat Daniels** (EAC member), **Carolyn Solimine** and **Rae Toscano** of the IEEE Education Department staff and me. This is an ambitious project, and will certainly improve a selection and training program that in my view is already very good. Besides the traditional face-face workshop format with Powerpoint slides, a variety of mechanisms for delivering training are being considered, including web seminars and self-paced instruction, videos, and role playing. Also under consideration is a possible broadening of the training experience, potentially to include a pre-workshop component, some form of the traditional workshop, and "just-in-time" training prior to the visit. This project is specifically not addressing any changes in either the accreditation criteria or the basic process by which the accreditation reviews are carried out. If you have any comments or suggestions for us based on your experiences on either side of the system (as a program evaluator or member of a program being evaluated), please let me know at [j.orr@ieee.org](mailto:j.orr@ieee.org).

*John Orr*

# ICECE'05 International Conference on Engineering and Computer Education

“Building a Common Space for the Education of Engineers”

Madrid, Spain, November 13-16 2005

## The Origins

This conference has its origins in the joint effort of the two most important American societies in the engineering education area, ASEE - American Society for Engineering Education in partnership with IEEE - Education Society, and their respective conferences that occurred in North America, the *ASEE Conference* and the *Frontiers in Education Conference*.

The advance and the technological progress of the computer science and the need of a stage for discussion of its education to the international level, encouraged ASEE and IEEE together, with IGIP - Internationale Gesellschaft für Ingenieurpädagogik and SEFI - Société Européenne pour la Formation, to give Ingénieurs who have joined the computation area, the ICECE - International Conference on Engineering and Computer Education.

During the last International Conference on Engineering and Computer Education (ICECE) celebrated in Santos, Brazil, it was agreed along with its General Chair, Prof. Doctor Claudio da Rocha Brito, to host the next conference in Madrid, Spain, to continue the momentum. The changes that are happening now in Europe have resulted in greater interest in the development of a European Higher Education Space and can be counted upon to foster additional interest in the discussion of educational issues in an international forum. This factor was decisive in moving the 2005 conference to Madrid, Spain, to be hosted by the Polytechnic University of Madrid with participation from the Spanish Chapter of IEEE-ES.

## Conference Information

The construction of the “Knowledge Society” is now widely recognised as an irreplaceable factor for human and social progress. This development is capable of giving its citizens the necessary competencies to face the new challenges and contribute to reach the awareness of the importance of the shared values and belonging to a common social and culture space. This mission is only obtained through the strengthening of cooperation in educational terms. The creation of Common Spaces for the Higher Education in different international geographical areas demonstrates this commitment.

*ICECE'2005, International Conference on Engineering and Computer Education*, will be held in Madrid, Spain from November 13 to November 16, 2005, an attractive European tourist and cultural city accustomed to serving as a forum for the exchange of opinions and ideas. The official languages will be English and Spanish. In this edition, ICECE is hosted by the Polytechnic University of Madrid and the Spanish

chapter of the IEEE Education Society, along with the technical collaboration of important and prestigious international educational societies in Engineering, which will assure, through the International Program Committee, the quality of the papers approved. Proceedings will be published in a book with ISBN and all the abstracts will be provided in a multilingual environment of up to seven languages.

As Europe is currently intensively living the construction of a Higher Education Common Space, the topics of the Conference will cover those issues through plenary sessions and technical works that promote the development of these types of environments.

Plenary sessions will cover the main tracks of the Conference:

- Competencies of practice engineers, from the academia and industrial viewpoint.
- The position the Education Societies face in the building of Common Spaces for Higher Education (mobility, recognition of diplomas, reforms of curricula...) with presentations of presidents of American and European Societies.
- Accreditation in Engineering, with participation of representatives of ABET and the ENQA, the European Association for Quality Assurance in Higher Education.

Technical sessions will cover works of Engineering and Computer Education, especially experiences about:

- Adoption of systems of easily readable and comparable degrees.
- Establishment of the system of credits as a proper means of promoting the most widespread student mobility.
- Promotion of mobility by overcoming obstacles to the effective exercise of free movement.
- Accreditation, quality assurance and certification issues with a view to develop comparable criteria and methodologies.
- Curricular development, inter-institutional co-operation, and integrated programmes of study.
- Relationships between students, teachers and the industry.
- Innovative teaching methods, Active / cooperative learning, distance learning, learning models, web-based education.
- Resources to teach.
- New forms to plan courses.
- Training based on competencies.
- New evaluation systems.
- Others, such as ethics or faculty career development



## ICECE Conference Committees

**General Chair.** **Edmundo Tovar**

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For further information, please see the conference web site at <http://www.fi.upm.es/icece05>

*Submitted by Manuel Castro  
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## Join Us in Indianapolis for FIE 2005!



### 19-22 October 2005

The 2005 *Frontiers in Education* Conference (FIE 2005) continues a long tradition of promoting the widespread dissemination of innovations that improve computer science, engineering, and technology (CSET) education. FIE is a major annual international conference devoted to improvements in CSET education. It is an ideal forum for sharing your ideas, learning about new developments in CSET education, and interacting with your colleagues.

CSET education faces significant challenges, such as rapidly evolving technologies, globalization, changing student demographics, and problems associated with funding higher education. Moreover, the rapidly emerging global economy is profoundly affecting the employment patterns and the professional life of CSET graduates. Articles in recent issues of the *ASEE Prism* and other CSET education literature suggest that current educational practices and policies are not sufficient for dealing with these changes. Successfully addressing these issues will require innovative solutions, including use of new pedagogies and technologies that improve student learning; partnerships among universities, industry, government, and K-12 educators; curriculum reform; and distance learning. This year, we are especially interested in abstracts that address changes foreseen for CSET education and CSET graduates because of predicted changes in the industries they will enter.

### Papers, Works in Progress, Panels, & Interactive Sessions

Topics will include:

- Accreditation and assessment
- Active learning
- Capstone and senior design experiences
- Computer and Web-based software
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- CSET educational research
- Distance learning: Methods, technologies, and assessment
- Diversity: Valuing it, achieving it, and teaching it

- Entrepreneurship programs
- Ethics: Creative ways to teach and assess it
- Faculty development
- First-year courses and programs
- Globalization: Preparing faculty and students
- Innovative degree programs and curricula
- Innovative uses of technology in the classroom
- K-12 initiatives and partnerships
- Laboratory experiences: On-site and at a distance
- Learning models
- Lifelong learning
- Nontraditional students
- Partnerships (industry, government, university, international)
- Service learning
- Software engineering
- Student retention and persistence
- Teaming
- Undergraduate research experiences
- Women in CSET education

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Located between the Indiana Convention Center/RCA Dome and the state capitol, it is fronted by the beautiful Capitol Commons park. The hotel provides full services, including restaurants, a business center, and exercise facilities. Some of the city's finest shops, restaurants, and attractions are conveniently connected to the hotel. A short walk takes you to the RCA Dome, Conseco Fieldhouse, Victory Field, the NCAA Hall of Champions, museums, and the IMAX theater and Indianapolis Zoo.

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This may sound like a repeat, but, again a big Thanks to **Rob Reilly** who has redesigned and rejuvenated the *IEEE Education Society Web Site*. If you have not already visited our new web site, please check it out at [www.ieee.org](http://www.ieee.org).

The above message began the April 2004 editor column. But, believe it or not, the web site has been re-designed again.

No “standing still” for Rob and his stewardship of our web site. Thanks Rob!

Elsewhere in this issue of *The Interface* you will find another excellent discussion of the role of biology in ECE curricula by **Ken Jenkins, Stephen Goodnick, and Ken Conner**. This topic is receiving considerable attention because of increased research funding as well as increased interest by prospective students in the “bio-X” fields. With articles in last April’s *Interface* and this issue, clearly this is an issue that will be with us for awhile.

The situation with respect to licensing of professional engineers is treated nicely by **Moshe Kam**, Vice-President, Educational Activities, IEEE. On the horizon is the issue of

licensing of software engineers. An excellent article in the *IEEE Technology and Society Magazine* by **Phillip LaPlante**, “Professional Licensing and the Social Transformation of Software Engineers” (*Technology and Society Magazine*, Summer 2005) does a nice job of providing an historical basis for licensing of various professions. Software engineering licensing is compared to the situation with respect to medical doctors in the nineteenth and eighteenth centuries. It’s interesting reading for those who want to go deeper into the issues. (Note: The article states there are “no software engineering programs accredited by ABET”. This statement is no longer true as there were six programs accredited by ABET as of June 2005.)

As you plan your activities for the month of October, don’t forget the premier engineering education conference, the *2005 Frontiers in Education Conference*, will occur in Indianapolis, IN, USA, 19-22 October. Join your colleagues in technical sessions and for informal conversations on what will be a packed four days of activities.

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